

# Genitive Quantifiers in Japanese as Reverse Partitives\*

Uli Sauerland and Kazuko Yatsushiro

November 2004

## Abstract

Quantificational determiners in Japanese can be marked with genitive case. Current analyses (for example by Watanabe, *Natural Language and Linguistic Theory*, to appear) treat the genitive case marker in these cases as semantically vacuous, but we show that it has semantic effects. We propose a new analysis as reverse partitives. Following Jackendoff (MIT-Press, 1977), we assume that partitives always contain two NPs one of which is phonologically deleted. We claim that, while in normal partitives the higher noun is deleted, in reverse partitives the lower noun is deleted.

---

\*We are grateful to Helen Stickney, Shoichi Takahashi, Satoshi Tomioka, and Akira Watanabe for helpful comments. Uli Sauerland received financial support from the DFG as an Emmy-Noether-Fellow (Grant SA 925/1) for some of the time of working on this paper.

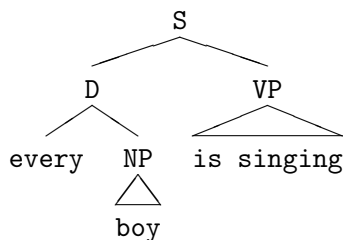
# 1 Introduction

Quantificational determiners have been an area of intense investigation in generative linguistics. One central insight has been that quantificational determiners are often the main functors of the clause they occur in ([ajdukiewicz:35]). Ajdukiewicz’s insight is preserved in standard generalized quantifier theory ([montague70] and others) as well as [matthewson01] recent modification of generalized quantifier theory (see also [sauerland03a]). For concreteness, we follow standard generalized quantifier theory ([montague70] and others) in this paper. According to standard generalized quantifier theory, quantifiers are analyzed as functors that take two properties as their argument (type  $\langle\langle e, t \rangle, \langle\langle e, t \rangle, t \rangle\rangle$  in the type notation used, for example, in Heim and Kratzer’s [heim98] textbook). As an example, we give the lexical entry of every in (1).

$$(1) \quad \llbracket \text{every} \rrbracket(R)(S) = 1 \text{ iff. } \forall x : R(x) = 1 \Rightarrow S(x) = 1$$

In the analysis of (2), NP and VP are the two arguments of every.

(2) Every boy is singing.



Japanese quantificational expressions present a puzzle for the view that quantificational determiners are the main functors

of the clause they occur in.<sup>1</sup> In the examples in (3), the quantifiers subete (all) and san-satu (three volumes followed by the classifier for books) seem to be marked with genitive case.

- (3) a. subete-no hon  
all-gen book  
'all books'
- b. san-satu-no hon  
three-cl-gen book  
'three books'

Compare the examples in (3) with the possessive genitive in (4):

- (4) Lina-no hon  
Lina-gen book  
'Lina's book'

Morphologically and syntactically (3) and (4) look alike. However, the genitive Lina-no in (4) is analyzed as either a modifier of the noun hon or as an argument of it ([jensen94][larson03], see also footnote ??). The quantifiers in (3), on the other hand, as we just saw, are semantically analyzed as taking the noun as its argument. It seems that the genitive quantifiers in (3) represent a genuine mismatch between syntax and semantics.<sup>2</sup>

---

<sup>1</sup>We are not considering the Japanese quantificational particles mo ('every') and ka ('a') here. These occur as suffixes to a noun and other constituents, and clearly belong to a different syntactic category from the Japanese quantificational expressions we are interested in (see [shimoyama01][yatsushiro01]).

<sup>2</sup>Note that a similar situation obtains between VP and the argument DPs: a non-quantificational DP is the argument of VP, while a quantificational

The central claim of our paper is that the syntax-semantics mismatch is only apparent. We will argue that the genitive case-marker no actually attaches to a silent noun phrase in (3), as shown in (5).

- (5)    subete/san-satu ~~hon~~-no    hon  
          all/three-cl    book-gen book

For our proposal, we assume the analysis of partitives of [jackendoff77]. Jackendoff argues that English partitives contain a deleted noun phrase as illustrated by (6).

- (6)    a. all ~~books~~ of the books  
          b. three ~~books~~ of the books

The main difference between English partitives and the Japanese construction in (4) on our analysis is that, whereas the higher noun is deleted in (6), the lower noun is deleted in the Japanese (5).

Previous analyses of the Japanese construction in ?? have treated the genitive case-marker no as semantically vacuous ([kawashima94][watanabe04]). This proposal has some plausibility because noun and quantifier can be combined in a variety of constructions in Japanese ([kawashima94][watanabe04][kobuchiphilip03][nakanishi03] and others). Four ways other than (4) to combine noun and quantifier are shown in (7). (In (7), the entire DP bears accusative case. DP takes VP (or possibly the whole clause) as its argument. In the case of quantificational arguments, however, the mismatch finds a syntactic reflection in quantifier movement as, for example, [heim98] discuss in detail.

For a different case-marking, replace any occurrence of o with the appropriate case-marker.)

- (7)
- a. hon-o     san-satu / hon-o     subete / hon-o     hotondo  
       book-acc three-cl / book-acc all     / book-acc most
  - b. hon san-satu-o     / hon subete-o / hon hotondo-o  
       book three-cl-acc / book all-acc   / book most-acc
  - c. san-satu hon-o     / subete hon-o     / hotondo hon-o  
       three-cl book-acc / all     book-acc / most     book-acc
  - d. hon-no     san-satu-o     / hon-no     subete-o / hon-no  
       book-gen three-cl-acc / book-gen all-acc   / book-gen  
       hotondo  
       most

[watanabe04], (21) proposes to derive ?? from (7b) by syntactic movement of the quantifier where the genitive marker no is inserted by the morphology. We disagree with Watanabe's analysis of ?? and propose a new analysis of ?? as a reverse partitive. One argument for our analysis comes from (8), which shows that there is a semantic difference between ?? and any of (7). (8) can only be true if John read a number of books which is greater than half of the total number of books in the context. If however hotondo-no hon is replaced with any of four other constructions with hotondo in (7), the resulting sentence is also true in a scenario where there is one relevant book, and John read most of that book.

- (8) John-wa hotondo-no hon-o yomi-oeta  
 John-TOP most-GEN book-ACC read-finished  
 'John finished reading most of the books.'  
 \*'John read most parts of the book(s).'

If (8) is transformationally related to one of (7), the absence of an interpretation available in (7) is unexpected, and we presently know of no proposal to account for it. As we argue in section ?? below, our analysis directly accounts for the semantic restriction of (8).

In Section ?? of the paper, we present our background assumptions on English partitives. Section ?? presents our analysis of the Japanese construction ?? and our arguments for this analysis, in particular the account of the semantic restriction in (8).

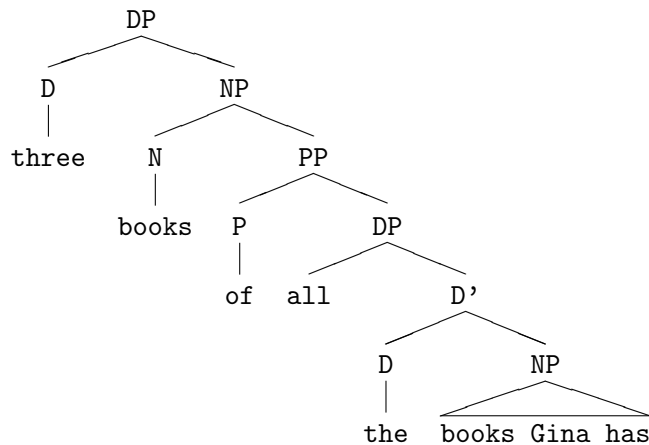
## 2 The Structure of Partitives

Partitives in English have been investigated, among others, by [selkirk77], [jackendoff77], [ladusaw82], [keenan86], [barker98], and [matthewson01]. Unfortunately not much is agreed upon even within this limited selection from the literature. Consider the different proposals for the DP three of the books: Keenan and Stavi assume that three of the forms a constituent, while the other authors assume that of the books does. Matthewson assumes that of has no semantic content, while Ladusaw and Barker argue that semantic content of of accounts for the partitive and anti-uniqueness constraints of partitives they discuss. The Japanese facts that we are interested in, however, lend themselves to a straightforward analysis if we adopt the proposal of [jackendoff77] for the syntax of partitives combined with the semantics [barker98] provides.

[jackendoff77] proposes that partitives always involve two NPs, and [barker98] proposes that of denotes the proper-part-of relation. We consider these two assumptions in turn, starting with the two NPs. In example (9), both of the NPs in the partitive are pronounced. In other partitives, we argue that one or both of these two NPs is phonologically deleted. We assume (9) has the structure in (10).<sup>3</sup>

(9) three books of all the books Gina has

(10)



One or both of the nouns in the partitive construction can undergo PF-deletion. In (11a), the higher NP is deleted, in (11b), it is the lower noun, and in (11c) both are deleted.

- (11) a. three ~~books~~ of all the books Gina has.  
 b. three books of those ~~books~~  
 c. three ~~books~~ of those ~~books~~

<sup>3</sup>We assume [brisson03] analysis of all here, but this will not be crucial for the following.

We assume that NP-deletion in partitives is subject to the same conditions that NP-deletion in general is subject to. Thereby, we also assume that NP-deletion is not generally forced to apply in partitives, as indeed it does not in (11a). If, however, we compare (12a) to (10b) and (10c), it seems that NP-deletion must apply to either the higher or the lower noun in this case. We assume that the oddness of (12) is the result of the violation of a pragmatic maxim that requires the deletion of a phrase X, unless the pronounciation of X serves a purpose like disambiguation.

(12) \*<sup>?</sup>three books of those books

As expected, then, (13), which is structurally similar to (12), is much more acceptable.

(13) Do you want three individual books of those books or three boxed sets?

One of [jackendoff77] arguments for the deletion analysis is based on a restriction on which determiners license NP-deletion. The determiners in (14b) do not license NP-deletion in English.

- (14) a. Sue read all these books, but John didn't read  
all/most/three/those/none ~~books~~  
b. \*Sue read all these books, but John didn't read  
the/every/no ~~books~~

As (15b) shows, the same determiners cannot occur in the higher position of a partitive if the noun is deleted.



- (15) a. John read all/most/three/those/none ~~books~~ of the  
books.  
b. \*John read the/every/no ~~books~~ of the books.

Because of the partitive constraint, only definite NPs are possible in the lower position of a partitive. (16) shows that deletion of the lower noun is possible with the demonstrative determiner and with a genitive, but not with the definite the. This is predicted by the proposal that (16) involves NP-deletion.<sup>4</sup>

- (16) a. John read most books of these/those/Bill's ~~books~~  
b. \*John read most books of the ~~books~~

The construction most books of Bill's that we consider as part of (16a) is sometimes referred to as the Double Genitive. [barker98] defends this assumption in detail. In particular, he discusses an anti-uniqueness condition that both types of partitives, double genitives and partitives where the higher noun is deleted are subject, are subject to. This is shown by (17) and (18) ((18) from [barker98]).

- (17) a. \*John read the one of Bill's books.  
b. \*John read the book of Bill's.

---

<sup>4</sup>Note that the licensing of NP-deletion in (16a) with the genitive Bill's below argues for an analysis where the genitive is not an argument of the noun like that of [larson03]: Because the two occurrences of books are required to have the same interpretation for ellipsis licensing and only one occurrence of books is modified with the genitive, the genitive cannot have an effect on the semantics of the noun.

- (18) a. \*I met the one of John's friends.  
 b. \*I met the friend of John's.

Barker points out that the parallel between the double genitive and the partitive constructions extends even further: Both constructions are acceptable again when a restrictive modifier is attached to the higher NP as in (19).

- (19) a. I met the one of John's friends that you pointed out last night.  
 b. I met the friend of John's that you pointed out last night

[barker98] proposes the lexical entry in (20) for partitive of which predicts the facts in (17) through (19).

- (20)  $\llbracket \text{of} \rrbracket(x)(y) = 1$ , if and only if  $y$  is a proper part of  $x$ .

Following [link83], we assume that humans can form conceptualizations that involve atomic, indivisible entities. Furthermore, they can form pluralities of these entities which are characterized by the atomic parts they have. Hence, this conceptualization amounts to an atomic semi-lattice in mathematics. If for example  $a$ ,  $b$ , and  $c$  are atoms corresponding to individual humans,  $a \oplus b$ ,  $a \oplus c$ ,  $b \oplus c$ , and  $a \oplus b \oplus c$  are the entities corresponding to pluralities of humans.  $a \oplus b$  is the plurality that has  $a$  and  $b$  as its only atomic parts.  $X$  is a proper part of  $Y$  holds if and only if all atomic parts of  $X$  are also atomic parts of  $Y$ , and furthermore  $X$  is distinct from  $Y$ . For example,  $a \oplus b$  is not a proper part of  $a \oplus b$ , but only of  $a \oplus b \oplus c$ .

As Barker shows in detail, the facts in (17) through (18) follows directly from the semantics in (20). In particular the definite descriptions in (17) and (18) lead to a presupposition failure because any countable entity has either no proper parts (atoms) or at least two proper parts (pluralities).<sup>5</sup>

While this was the case in the examples above, our analysis does not require that the two nouns in a partitive construction be identical. If another antecedent for NP-deletion is salient, it can license PF-deletion of a noun in the partitive construction as in (21).

- (21) a. John had to sort five stacks of books and two stacks of papers. He already managed three ~~stacks~~ of the books.
- b. Annoyingly some of the papers have missing pages. Two ~~pages~~ of the one I'm reading are gone.

Furthermore, we assume that the higher noun in a partitive construction can also be a mass noun as it is overtly in (22).

- (22) Some money of the stolen amount reappeared.

---

<sup>5</sup>Possibly, Barker's proper-part-of requirement should be derived from pragmatic principles, rather than built into the semantics. For example, (i) seems to require only that at least one of the relevant people have more than one sister, while Barker's proposal predicts that all of them should be required to have more than one. This is frequently found with requirements derived from pragmatics ([sauerland03a]).

(i) Everybody should invite one of his sisters.

A pragmatic derivation of the proper-parthood requirement could possibly start from the observation that, if it is not fulfilled, use of just the lower DP instead of the partitive is appropriate.

Consider now (23) where the lower DP is a singular definite. As (23) shows, the set of determiners that can occur with a singular definite is a subset of those that can occur in NP-deletion. In particular, the determiners in (23c), which can license NP-deletion and were acceptable in a partitive with a plural lower definite in ??, are ungrammatical with a singular definite.

- (23) a. All/Most ~~content~~ of the book is interesting.  
 b. \*The/No/Every of the book is interesting.  
 c. \*Three/None/Those of the book is interesting.

The determiners in (23a) can be characterized as those determiners that license NP-deletion and furthermore can take a mass noun as its complement. Therefore, we assume that it is a silent mass noun with a very bland meaning like stuff or content. We assume that deletion of this mass noun does not require a linguistic antecedent.

In principle, our analysis predicts that count NPs should also be possible with singular definites. However, if the silent NP was the same as lower NP as illustrated in (24), the proper-part-of requirement of [barker98] would not be satisfied.

- (24) \*One ~~book~~ of the book

As long as no other count NP antecedent to license deletion occurs in the discourse surrounding the partitive, therefore only the default count noun is predicted to be available. This approach is confirmed by the observation in (25).

- (25) I wish you could buy individual pages of a book, because often only a few pages of a book are interesting. ...  
For example, only three ~~pages~~ of this book are interesting.

In (25), the preceeding sentence makes the count noun page available as an antecedent for deletion. Therefore, the silent noun in the partitive can be page rather than the default mass noun that was required in (23).

Since a mass noun cannot be combined with the numeral three, (25) allows only the count noun interpretation. But, (26) shows that, in the same discourse context, all allows both the default mass noun and the count noun pages as the silent noun. The difference is reflected by the number agreement of the copula.

- (26) a. But, all ~~content~~ of this book is interesting.  
b. But, all ~~pages~~ of this book are interesting.

Even with a definite plurals in the lower position the silent higher mass noun seems to be possible. This assumption predicts that singular agreement is possible in (27a) ([selkirk77]).

- (27) a. Most ~~content~~ of these papers is boring.  
b. Most ~~papers~~ of these papers are boring.

The semantics of of we adopted from [barker98] does not allow mass nouns to occur as the higher noun in a partitive. We

therefore propose the revised lexical entry for of in (28).

Here, we adopt [link83]  $\mu$ -operator which maps an individual to the mass that makes up that individual.

- (28)  $\llbracket \text{of} \rrbracket(x)(y) = 1$ , if and only if  $y$  is a proper part of  $x$  or  $y$  is a part of  $\mu(x)$

To conclude the approach to English partitives that we adopted in this section combined two assumptions. Following [jackendoff77], we assume that partitives always contain two NPs. In most examples, the higher NP is phonologically deleted which is licensed either by semantic identity with the lower NP or some other available NP in the discourse, or because it is a default mass noun with the interpretation content. Following [barker98], we assume that of denotes the proper-part-of relation which we slightly generalized in (28) to be compatible with mass nouns in the higher noun position. In the following section, we turn now to the Japanese genitive marked quantifiers.

### 3 Japanese

In this section, we address the Japanese construction where quantifiers seem to bear genitive case. (29) (repeated from ??) shows examples of this construction with the quantifiers san-satu ('three volumes'), subete ('all'), and hotondo ('most'). As we mentioned in the introduction, the quantificational expression morphologically seems to be an argument of the noun. However, this would be puzzling from the perspective of general theories of nominal quantification ([montague70][matthewson01], among

others), because these theories assume that quantificational determiners are the main functors of the clause they occur in.

- (29) san-satu-no hon / subete-no hon / hotondo-no hon  
three-cl-gen book / all-gen book / most-gen book  
'three of the books / all of the books / most of the books'

In this section, we argue that the quantifiers in (29) neither are arguments of the noun, nor bear genitive case. Our proposal is that (29) is a partitive construction similar to the English example in (30) (repeated from ??), where we argued above that a lower occurrence of books is deleted.

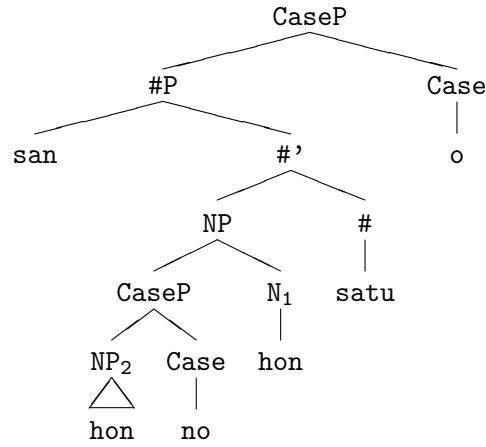
- (30) three books of those ~~books~~

Consider, for example, the derivation we propose for the (31).

- (31) san-satsu-no hon  
three-cl-gen book

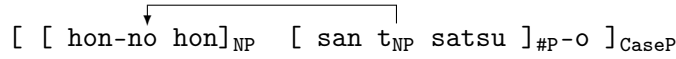
The base-generated structure of Japanese partitive constructions that we assume is illustrated in (32). Note that this is essentially the structure of the English partitives we adopted in ??, except for word-order and for the need to accommodate classifiers into the structure. Following [watanabe04], we assume that the classifier satsu is a #-head, and the numeral san occupies the specifier position of this head.

- (32)

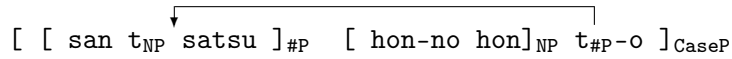


We propose that (31) is derived from the structure (32) in three steps: First, the NP moves to the left edge of CaseP, deriving (33a). Secondly, the #P remnant also moves to the left edge of CaseP, targetting a position higher than the earlier movement as shown in (33b).<sup>6</sup> Finally, the lower occurrence of the noun hon is deleted to derive (33c).

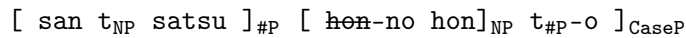
(33) a. ‘whole-CaseP movement’:



b. ‘Q-inversion’:



c. ‘whole-NP deletion’:



For the following, we use the terms whole-CaseP-movement for the first step, Q-inversion for the second step, and whole-NP deletion for the third step of this derivation. We

---

<sup>6</sup>For our purposes, it is irrelevant whether the two movements to the left edge of CaseP, movement of the NP and movement of the #P remnant, target a specifier position or an adjoined position.



address each of these assumptions in more detail to show that they are all independently justified.

Consider first the whole-CaseP-movement. As [watanabe04] already shows, this operation must be assumed to be obligatory on his analysis of numerals and classifiers, because the NP cannot occur between the numeral and the classifier as (34a) shows.

- (34) a. \*san hon satu-o  
three book cl-acc  
b. hon san-satu-o  
book three-cl-acc

Now, consider Q-inversion. This operation, too, is already present in Watanabe's proposal. Namely, he proposes that (35a) is derived from (34b) by means of remnant movement of the phrase san-satu as shown in (35b).

- (35) a. san-satu hon-o  
three-cl book-acc  
b. [ [ san t<sub>NP</sub> satu ]<sub>DP</sub> [ hon ]<sub>NP</sub> t<sub>DP</sub> o ]<sub>CaseP</sub>

Hence, the operation underlying Q-inversion is also independently required. However, in (35a) the application of Q-inversion is optional, as (34b) is fully grammatical as well. This is not the case for the the genitive quantifier construction in ???. As (36) illustrates, the example is ungrammatical if #P-remnant is not moved to the CaseP initial position.

- (36) \*no hon san satu o  
gen book three cl acc

Why is Q-inversion obligatory in (36)? We propose that the affixal nature of no is the reason for the obligatoriness of

Q-inversion. Specifically, we propose that no requires the presence of a noun or adjective to its left that is contained in the same CaseP. Such an assumption is independently needed for the use of no as an NP-pronoun.<sup>7</sup> (37) shows that one in English and no in Japanese can both be used as NP-pronouns when they follow an adjective (the intended interpretation of one/no is indicated by the material in square brackets). But, as (38b) shows, Japanese no cannot be used as an NP-pronoun without a preceeding adjective, while English one in (38a) is not subject to this restriction.<sup>8</sup>

(37) Talking about bears:

- a. I have seen one a black one [bear].
- b. kuroi ~~kuma~~ no-o mita  
black ~~bear~~ one-acc mita  
'I saw a black bear.'

(38) a. I have seen one [bear].

- b. \*~~kuma~~ no-(o) mita  
~~bear~~ one-(acc) saw

The ungrammaticality of (38b) follows if no requires a phonologically overt noun or adjective within the same CaseP to its left it can attach to. If we assume that the genitive

---

<sup>7</sup>We adopt the term NP-pronoun from ([jackendoff77], 58) for concreteness (actually N'-pro in Jackendoff's X-bar schema). For our analysis, it does not matter whether one in English and no in Japanese is a pronominal NP or the spell-out of a higher functional head with a deleted NP complement.

<sup>8</sup>Note that it is not sufficient for no to attach to the subject. This is illustrated by (i):

- (i) \*boku-wa ~~kuma~~-no mita  
I-top ~~bear~~-gen saw

case marker no and the NP-pronoun no are subject to the same morphological restrictions, it follows from the affixal nature of no that Q-inversion in (37) is obligatory.

Finally, consider the third step of ??: whole-NP deletion. NP-deletion is independently known to be possible in Japanese ([saito90]). However, NP-deletion in partitives has not been discussed in Japanese before, as far as we know. Consider the regular Japanese partitive in (39). We assume that (39) has essentially the same structure as the regular English partitive in ?? above.

- (39) (Gina-ga motteiru) hon-no san-satu-o  
 (Gina-nom has) book-gen three-cl-acc  
 ‘ three of the books (that Gina has).’

We propose that (39), like ??, is derived by deletion of the higher noun in the partitive structure. ?? shows the underlying structure of (39). (39) is derived by the application of whole-CaseP-movement and deletion of the higher occurrence of hon.

There is, however, one difference between English and Japanese. In English, example (40a) (repeated from ??) shows that deletion is not obligatory in all partitives. In Japanese, however, even in the literal translation of (40a) one of occurrences of the noun hon (‘book’) must be phonologically deleted.

- (40) a. three books of all the books Gina has

- b. \*Gina-ga motteiru (subete-no) hon-no hon  
       Gina-nom has           (all-gen)   book-gen three-cl-Macc  
       san-satsu-o

Therefore, we must assume that the application of NP-deletion is obligatory in partitive structures in Japanese. NP-deletion can apply to either the higher or the lower noun in (40): deletion of the lower noun in (40) derives (41a), while deletion of the higher noun triggers obligatory Q-inversion as discussed above and then yields (41b).

- (41) a. Gina-ga motteiru (subete-no) hon-no ~~hon~~ san-satsu-o  
       b. Gina-ga motteiru san-satsu ~~hon~~-no hon-o

Note that NP-deletion in partitives is obligatory in many cases in English too, as (42) exemplifies.

- (42) a. \*<sup>?</sup>three books of the books  
       b. \*<sup>?</sup>all good books of your books

As mentioned in Section 2, we assume that there is a pragmatic requirement that forces phonetic deletion of a phrase X when deletion of X is licensed and pronunciation of X does not serve any other purpose (for example, disambiguation in (40a)). At this point, however, we must leave the details of this account up to future research.

Now consider the interpretation of the Japanese partitive structure. We assume that the no contributes the same interpretation as the English of, and therefore our account of English partitives following [barker98] carries over straightforwardly to the Japanese construction. Recall from

section 2 that we assume that the two NPs in the partitive structure are not required to be identical in two cases: either the deleted noun is the very general content/stuff, or the discourse contains another NP that can license deletion of one of the NPs in the partitive construction. This predicts that the the genitive quantifier construction in Japanese can differ from the English or Japanese partitive semantically. Specifically, we observe a contrast with respect to the partitivity requirement: While the normal partitive (43a) is unacceptable in a situation where only three books are relevant, (43b) is acceptable in the same scenario.

- (43) a. Taroo-wa hon-no san-satu-o yomi-oeta  
 Taro-top book-acc san-cl-acc read-finished  
 ‘Taro has finished reading three of the books.’  
 b. Taroo-wa san-satu-no hon-o yomi-oeta  
 Taro-top san-cl-gen book-acc read-finished  
 ‘Taro has finished reading three books.’

The interpretation of (43a) follows directly from Barker’s proper-part-hood requirement, which amounts to a presupposition of (43a) that there be more than three books around. That (43b) lacks this presupposition is also predicted by our analysis: If the deleted lower noun in (43b) is not book, but something less specific like stuff, the proper-parthood requirement then amounts to just a presupposition that there be some thing other than the three books. This presupposition is essentially vacuous.

Further support for our analysis comes from the interpretation of hotondo (‘most’) in these constructions. As is the case with the numeral quantifier, there are two possible partitive

constructions with hotondo, as shown in (44). In (44a), the higher noun is deleted, and the lower noun is deleted in (44b).

- (44) a. John-wa hon-no hotondo-o yomi-oeta.  
           John-top book-gen most-acc read-finished  
           ‘John has finished reading most of the book(s).’  
       b. John-wa hotondo-no hon-o yomi-oeta  
           John-top three-cl-gen book-acc read-finished  
           ‘John has finished reading most of the books.’

These two sentences differ in interpretation. (44a) allows the two readings in (45), which differ with respect to what the whole entity parts of which are considered can be: in (45a), the whole can be a single book (higher noun = hon ‘a single book’, lower noun = ‘content’), while in (45b), it is a set of books (higher noun = hon ‘books’, silent lower noun = ‘books’). When the higher noun is interpreted as a single book, and the lower noun is understood to be ‘content’, the interpretation where hotondo quantifies over parts of a book arises. In this case, the whole entity can be a single book. If, however, the higher noun is hon (‘book’), it follows from [barker98] proper-part-of requirement that the whole must be a plurality of books, because a single book does not have any proper parts that are books. Quantification in (45b) then ranges over the individual books that are part of the this plurality.

- (45) a. John has finished reading most content of the book.  
       b. John has finished readings most books of the books.

In (44b), on the other hand, only interpretation (45b) is available. The reading in which quantification of hotondo is

over parts of a single book as in (45a) is not allowed. This is predicted by our theory. According to our analysis, the lower noun is deleted to derive the reverse partitive construction. The reading in which quantification is over parts of a book is possible only when the higher noun is covert, being interpreted as stuff. This is not possible in (44b), however, since the higher noun hon ('book') is pronounced, and therefore, can be only interpreted as books.

It is useful to point out that non-partitive DPs with hotondo, like the regular partitive (44a), allow an interpretation where quantification ranges over book-parts. For example, both (46a) and (46b) allow an interpretation paraphrasable as most of the book.

- (46) a. John-wa hon hotondo-o yomi-oeta  
           John-top book most-acc read-finished
- b. John-wa hotondo hon-o yomi-oeta  
           John-top most book-Macc read-finished

The difference in interpretation between (44b) and (46) therefore corroborates our claim that (44b) is not transformationally related to the non-partitives in (46) (contra [watanabe04]). Furthermore, we argued that the difference in interpretation between (44b) and (46) follows directly from our analysis of (44b) as a reverse partitive. Therefore, (44b) empirically supports our analysis.

## 4 Conclusion

The problem we addressed in this paper is the apparent syntax-semantics mismatch that Japanese genitive marked quantifiers present. In examples like (47), it seems that the quantifier hotondo ('most') is syntactically an argument of the noun hon ('book'), even though the quantifier is semantically the main functor of the clause.

- (47) hotondo-no hon  
      most-gen book

We argued that (47) is derived from a partitive structure with deletion of a noun phrase as shown in (48). The genitive marker no is actually the case marker of the deleted noun phrase, but attaches to the quantifier because the NP is deleted.

- (48) hotondo ~~hon~~-no hon

Our analysis was based on the analysis of partitives of [jackendoff77], who proposes that partitives always contain two NPs. In a standard partitive like (49a) the higher one of these NPs is phonologically deleted. However, we showed that phonological deletion of the lower one is also possible in a reverse partitive like (49b).

- (49) a. one ~~book~~ of those books  
      b. one book of those ~~books~~

For Japanese, we claimed that both deletion options are available as well: Deletion of the higher noun yields the normal partitive in (50a). In the reverse partitive in (50b), however, deletion



of the lower noun requires movement of hotondo ('most') to the left so that the affix 'no' has a morphological host.

- (50) a. hon-no ~~hen~~ hotondo  
book-gen ~~book~~ most
- b. hotondo ~~hen~~-no hon  
most ~~book~~-gen book

In Section 3, we showed that the semantic properties of (47) provide further support for our analysis in terms of the reverse partitive structure (50b).

Our analysis has three important implications for the theory of grammar: First, it shows that genitive case-marked quantifiers in Japanese are not problematic for general theories of quantification, though they initially seem to be. Secondly, our analysis supports the analysis of partitives of [jackendoff77] which assumes that partitives prior to phonological deletion always involve two noun phrases. In particular, we showed that deletion can target either the higher or the lower NP. And thirdly, we argued that, in addition to any NP that is salient in the discourse, deletion of a bland noun with the interpretation of content is always licensed.

## Bibliography

- Ajdukiewicz, Kazimierz. 1935. Die syntaktische Konnexität. *Studia Philosophica* 1:1-27.
- Barker, Chris. 1998. Partitives, double-genitives, and anti-uniqueness. *Natural Language & Linguistic Theory* 16:679-717.

- Brisson, Christine. 2003. Plurals, all, and the nonuniformity of collective predication. *Linguistics and Philosophy* 26:129-184.
- Heim, Irene, and Angelika Kratzer. 1998. *Semantics in generative grammar*. Oxford: Blackwell.
- Jackendoff, Ray. 1977. *X̄-bar syntax: A study of phrase structure*. Cambridge, Mass.: MIT Press.
- Jensen, Per Anker, and Carl Vikner. 1994. Lexical knowledge and the semantic analysis of Danish genitive constructions. In *Topics in knowledge-based NLP-systems*, ed. Steffen Leo Hansen and Helle Wegener, 37-55. Copenhagen, Denmark: Samfundslitteratur.
- Kawashima, Ruriko. 1994. The structure of noun phrases and the interpretation of quantificational NPs in Japanese. Doctoral Dissertation, Cornell University.
- Keenan, Edward, and Y. Stavi. 1986. A semantic characterization of natural language determiners. *Linguistics and Philosophy* 9:253-326.
- Kobuchi-Philip, Mana. 2003. *Distributivity and the Japanese floating numeral quantifier*. Doctoral Dissertation, City University, New York.
- Ladusaw, Bill. 1982. Semantic constraints on the English partitive construction. In *Proceedings of WCCFL 1*, ed. Daniel P. Flickinger, Marlys Macken, and Nancy Wiegand, 231-242. Stanford, Calif.: CSLI, Stanford University.

- Larson, Richard, and Sungeun Cho. 2003. Temporal adjectives and the structure of possessive DPs. *Natural Language Semantics* 11:217-247.
- Link, Godehard. 1983. The logical analysis of plurals and mass terms: A lattice theoretical approach. In *Meaning, use, and the interpretation of language*, ed. R. Bäuerle, C. Schwarze, and A. von Stechow, 302-323. Berlin: de Gruyter.
- Matthewson, Lisa. 2001. Quantification and the nature of crosslinguistic variation. *Natural Language Semantics* 9:145-189.
- Montague, Richard. 1974[1970]. The proper treatment of quantification in ordinary English. In *Richard montague: Selected papers*, ed. R. Thomason, 247-270. New Haven, Connecticut: Yale University Press.
- Nakanishi, Kimiko. 2003. The semantics of measure phrases. In *The Proceedings of NELS 33*, ed. Makoto Kadowaki and Shigeto Kawahara, 225-244. Amherst: GLSA, University of Massachusetts.
- Saito, Mamoru, and Keiko Murasugi. 1990. N'-deletion in Japanese. In *Uconn working papers in linguistics 3*. Storrs: Department of Linguistics, University of Connecticut.
- Sauerland, Uli. 2003. A new semantics for number. In *The Proceedings of SALT 13*, 258-275. Cornell University, Ithaca, N.Y.: CLC-Publications.

- Selkirk, Lisa. 1977. Some remarks on noun phrase structure. In  
Studies in formal syntax, ed. P. Culicover, T. Wasow, and  
A. Akmajian, 285-316. New York: Academic Press.
- Shimoyama, Junko. 2001. Wh-constructions in Japanese. Doctoral  
Dissertation, University of Massachusetts, Amherst.
- Watanabe, Akira. to appear. Functional projections of nominals in  
Japanese: Syntax of classifiers. *Natural Language & Linguistic  
Theory* xx:xx-xx.
- Yatsushiro, Kazuko. 2001. The distribution of mo and ka and its  
implications. In *Proceedings of the Third Formal Approaches to  
Japanese Linguistics*, 181-198. Cambridge, Mass.: MIT Working  
Papers in Linguistics.